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Overview

- New Earth System Curator project - Scaling Up: Introducing Commodity Governance into Community Earth Science Models (Curator CoG)
- Funded by the US NSF(4 years, $2.1M), starting early 2010
- Team includes: NCAR, GFDL, University of Michigan, University of Colorado - mix of social scientists, software developers, and physical scientists
- Goal is to understand and promote infrastructure for governance in community modeling projects

Motivation

- Complex scientific problems, projects and products require large-scale coordination
- Emergence of extensive, distributed, virtual scientific organizations – "communities of communities"
- Need for routine, transparent governance, encoded in software and integrated into collaborative on-line environments
- Support for different time scales necessary: persistent modeling systems (~decades), campaigns such as CMIP5 (~years), and short-term experiments (<months)

Curator Commodity Governance

Commodity Governance

- Commodity governance encodes aspects of governance in software to create virtual units that can operate, aggregate, and coordinate in a decentralized fashion.
- Commodity governance concepts will be explored using a set of modeling projects and a base of infrastructure projects

Modeling projects

PROJECT	Community Climate System Model (CCSM)	Community Surface Dynamics Modeling System (CSDMS)	National Unified Operational Prediction Capability (NUOPC)
Domain	Climate modeling	Surface dynamics modeling	Numerical weather prediction
Status	Community model since 1983	Started in 2007	New initiative, to start in 2010
Significance	One of the first and most successful community models	New community effort with academic focus	Introduces community model co-development into operational weather prediction
Scale	Components: land, sea ice, ocean, ice sheet, atmosphere plus coupling software; multiple atmospheric dynamical cores	100 model codes (not yet integrated)	3 agencies, about 12 components (atmosphere, land, sea ice, ocean, atmospheric physics, atmospheric dynamics)
Goal	Climate research; participation in assessments	Simulate the evolution of landscapes and sedimentary basins over a range of time scales	Develop an operational multi-model ensemble for numerical weather prediction

Curator Commodity Governance

Infrastructure projects

- Earth System Modeling Framework – US multi-agency model coupling framework
- METAFOR – EU team developing standardized metadata for climate models
- Earth System Grid – DOE-funded distribution portal for climate model output, other datasets, models and tools

Sociotechnical analysis

- Conducted by University of Michigan social scientists for target CoG modeling projects
- Review of historical documents and events
- Interviews and surveys of project members regarding governance structures
- Observation of project activities, including on-site visits
- Analysis of information in theoretical context – touches on history of infrastructure, psychology, organizational and political studies

Software development

- Extension of the personal and group workspace concept in an ESG-based prototype
- Workspace enables participants to identify and share collections of datasets and simulations, run workflows for analysis or other activities, and store and annotate results
- Workspaces may be identified with projects, experiments, particular model components, etc.
- Governance interactions are encoded as criteria for participation, administrator structure, rules for access to other projects, etc.

Pilot projects

- Second summer colloquium on atmospheric dynamical cores (2012), lead Christiane Jablonowski/University of Michigan
- Summer school on atmospheric parameterizations (tentatively 2010), lead Dave Randall/CSU
- Pilot projects encourage examination of specific model components by cross-institutional communities
- Will guide and exercise new development

Summary

- New Curator project focuses on governance in virtual organizations
- Elements of the project include
  - A sociotechnical study of the governance in three community modeling groups
  - Development focused on workspaces and workflows
  - Pilot projects centered on atmospheric dynamics and physics model components